

In Memoriam

Arthur Edwin Boycott

1877-1938



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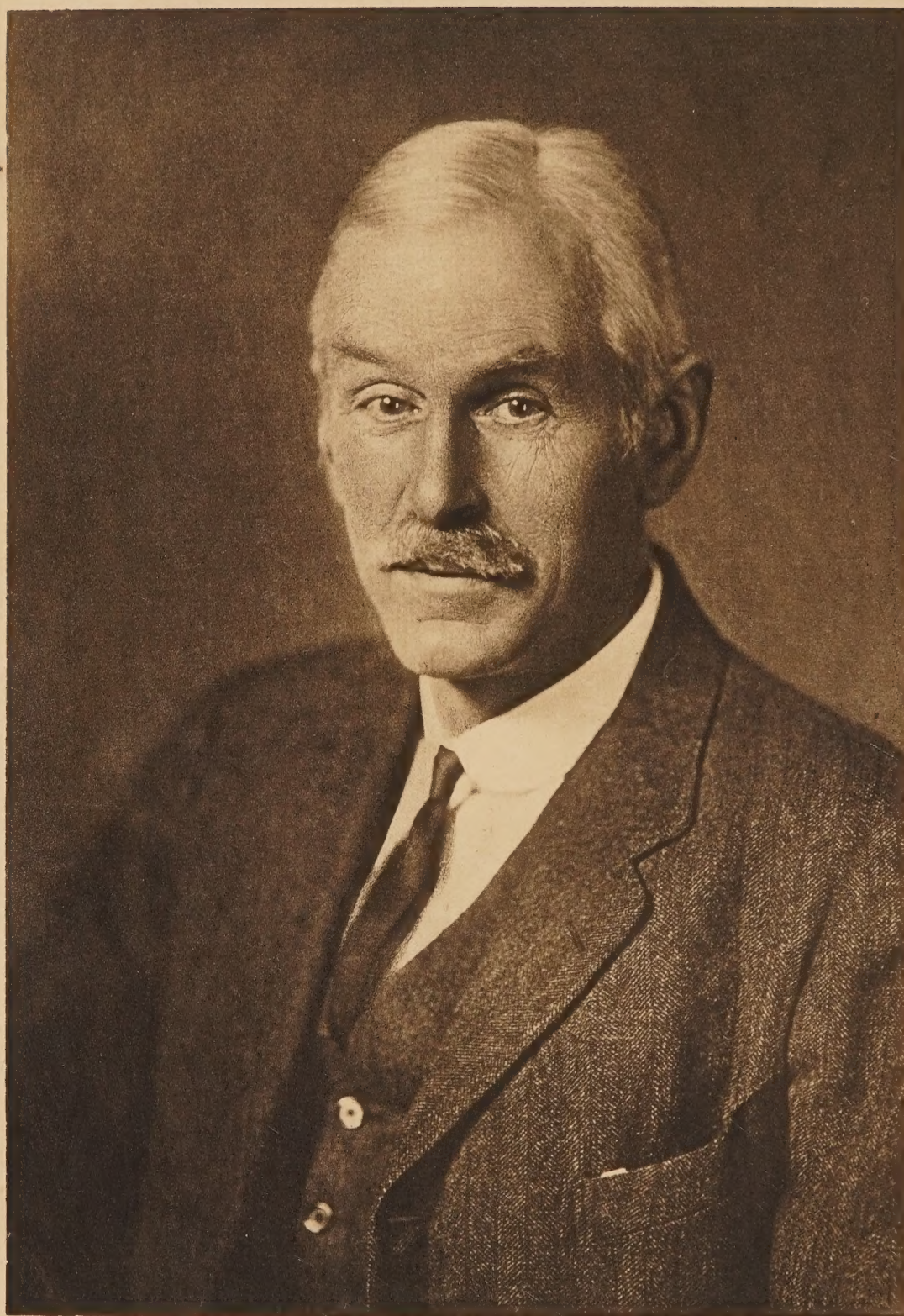
1877-1938

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A. C. Baycott

Arthur Edwin Boycott

Born 6th April 1877. Died 12th May 1938.

(FRONTISPIECE.)

ARTHUR EDWIN BOYCOTT, the third son of William Boycott of The Grange, Broomy Hill, Hereford, and Eliza Mellard his wife, was born on 6th April 1877 and educated at Hereford Cathedral School, whence he won the senior classical scholarship at Oriel College. At that time science, to say the least of it, was not highly regarded by the senior common room of that ancient foundation, and Boycott, although he had gone up as a classical scholar, had set his heart on reading science. There is reason to believe that he succeeded in this ambition by waylaying the kind-hearted provost in the quadrangle very soon after arrival and obtaining his permission before discussing the matter with the senior tutor, who would certainly not have agreed otherwise. He matriculated at Oxford in 1894 and in 1898 was placed in the first class by the examiners in the honour school of natural sciences (physiology). He took the degrees of M.A. and B.Sc. four years later. In 1899 he was elected to the Bishop Fraser scholarship at Oriel College and in the following year to a senior demyship at Magdalen College.

His tutor at Oriel was the Reverend Lancelot Ridley Phelps, later Provost of the College, and Boycott has left on record a delightful account of his association with that very remarkable man. "I was I think the only man reading science in college, and there was no science fellow to guide my studies, and I suppose I was assigned to Phelps because he was a political economist with a special interest in the outcast and needy, and a distinguished chairman of the Oxford Board of Guardians. He must have been nearing 50 at the time, had an impressive beard, wore a straw hat through the winter, and lunched daily off a rice pudding. He told me that of course he knew nothing about the available lectures and classes in natural science, and that I had better go to the museum to a man called Burdon Sanderson and ask him what I had better do ; meanwhile would I write him an essay on—I forget what, but it would be ' party government ' or ' is the good always the beautiful ? ' or something of that sort—and bring it to him

next Tuesday night at 9 o'clock. And so for several years I spent an hour or an hour and a half with him each week, reading him the essays of a very crude boy and listening to his talk ; talking was his specialty in life, and he was very good at it, and often enough my first few sentences would fire him off for the rest of the evening. Once his friend York Powell came across from the House, and I sat in the corner and heard such talk as I had never dreamed of. He took me for Sunday walks to Otmoor and over Wytham Hill and round the countryside, never emerging from college till 11.1 A.M. when every one was safe in church, never smoking in public, and always talking and trying to make me talk on questions which I had never known to exist, and which had this only in common that they had nothing whatever to do with natural knowledge ; indeed, I do not think he had the least idea what science was about or took any interest in it. But . . . one way and another he gave me one of the finest doses of education I have had from anybody, which I remember gratefully when I help myself to brown sugar out of the beautiful little bowl he gave me for a wedding present." (From a rustivating pathologist, *The Lancet*, 1937, i. 533.)

From Oxford Boycott went to St Thomas's Hospital where he won the Wainwright prize and the Seymour Graves Toller prize in medicine, the public health prize, the Hadden prize and the Grainger testimonial prize for original work in physiology. In 1902 he was admitted to the B.M., Ch.B. degrees at Oxford and in 1903 he was elected to a prize fellowship at Brasenose College which he held for seven years. He became D.M. in 1904. A catalogue of his academic achievements, remarkable and impressive as it is, gives but a one-sided impression of Boycott as a young man. Tall and spare in figure, lithe and active in his movements, he was conspicuous among his contemporaries. A slight stoop forward from the hip, a certain dignity of carriage and manner added not a little to the distinction of his appearance. The Medical School at Oxford in the closing years of the nineteenth century was small and formed a close and intimate society, the members of which knew each other thoroughly and well. Of this small group Boycott was the acknowledged chief and leader. His contemporaries admired him and looked up to him but regarded his learning with some awe : the demonstrators treated him with respect. It was believed that he discussed scientific problems as an equal with professors : it was rumoured that on at least one occasion he had rebuked and confuted the examiner in a viva-voce examination.

He was proud of his early classical education and in later life often declared that the best scientists were those who had begun life in that discipline. For pure scholarship of a textual kind he

had a great admiration, but he was in his early days rather contemptuous of literature and poetry he disliked. In later years his outlook changed and he grew to enjoy literature for its own sake. Another of his boyhood's interests, the study of snails, remained an absorbing passion throughout his life. While still at school he made a list of the mollusca of Herefordshire, which was published in *Science-Gossip* in 1892 when he was only 15 years of age. "Not that the following list is meant to be complete by any means, but I trust that it will serve as a basis for further records, and also interest some of your readers who pay attention to the distribution of British mollusca. Messrs Taylor and Roebuck's list (as given in Mr Williams' smaller work) comprises only thirty-six species, . . . so far, that is in the last two years, I have, with the invaluable aid of Mr E. W. Bowell, increased the list to eighty-seven species. . . . Of course, I have not yet worked nearly the whole of the county, and no doubt many new species will be added by further search." In molluscs he was interested from every aspect, in their structure, function, life history and heredity. From them he drew examples of the laws of life and evolution. In the most active period of his life as a pathologist he never lost interest in what was to him his second science rather than his hobby. In the days of his retirement his favourite study provided interest and employment for a still active brain and no fewer than five papers from his pen have appeared this year.

In 1898, after admission to the B.A. degree, he began research in the Physiology Department under Burdon Sanderson, as a result of which he published two papers, one on the response of muscle to two stimuli, the other on the effect of temperature on the conductivity of nerve. But interested as he was during this period in physiology he remained constant to his first love, and during his Oxford days published some six papers on the life of the small freshwater creatures which he loved so well. At Oxford Boycott worked with two other men who had no small influence on his work and subsequent career. For J. S. Haldane he had a deep admiration. With Haldane he paid a remarkable visit to Cornwall, where in the course of a few weeks the cause of an outbreak of anæmia among miners was discovered and the existence of ankylostomiasis in England was demonstrated for the first time. From Haldane he derived an interest in the blood which led to work on the blood volume marked in a high degree by accurate observation, well planned experiment and thoughtful deduction. His problems were always thoughtfully chosen and work once begun was continued until the results satisfied his own very high standard of criticism. From Haldane he derived the physiological bias which influenced so much of his work and almost all his teaching. From James Ritchie, Boycott received his first

instruction in pathology. Ritchie, in those days a physician on the staff of the Radcliffe Infirmary, conducted an evening class in elementary pathology and bacteriology. The class, three or four in number,* met in the Regius Professor's room in the Museum. The proceedings opened with tea and then Ritchie took his seat upon the table and read to us from his notebook. The lectures on bacteriology were taken perhaps from the manuscript of a well known book. A practical class followed when we looked at sections and tried to pour plates, not Petri dishes, but real plates perilously poised on a tripod and later to be covered by a belljar. Some of us were not very skilful but Ritchie appeared to enjoy our clumsiness. Better classes in pathology have never been given: no classes were ever more enjoyed. In this fashion in 1898 and 1899 Boycott was introduced to what was to become his life's work. Here and then began a friendship which endured and became closer as years went on.

In October 1900 Boycott entered the medical school of St Thomas's Hospital, and in the summer of 1902 he passed the final examinations for the B.M. degree after the shortest recorded period of clinical apprenticeship. In his last year as a student he won almost all the prizes open to competition and became in 1903 house physician to the late Theodore Dyke Acland. At Oxford Boycott had been an outstanding figure in the medical school: at St Thomas's his reputation grew. As a house physician he was efficient, but the daily routine of diagnosis and treatment interested him but little and his clerks, who had a profound respect for his learning, found his teaching above their heads.

In July 1903 he was appointed to succeed E. W. Ainley Walker as Gordon lecturer in pathology at Guy's Hospital and nobody was surprised to hear that he had returned to laboratory life. Actually it was a crucial decision. He had been on the point of going into general practice when Ainley Walker's persuasive efforts caused him to decide otherwise. Boycott's first sojourn at Guy's was short, for in October 1904 he was appointed an assistant bacteriologist at the Lister Institute. Here he found himself among congenial colleagues and in the environment of his choice. Here he lived and worked with C. J. Martin, J. B. Leathes, George Dean, E. P. Cathcart and others who became and remained his friends. Here he continued his work on ankylostomiasis and with J. S. Haldane and G. C. C. Damant carried out a well known experimental enquiry into the pathology of caisson disease. Papers on the seasonal prevalence of Hofmann's bacillus and on the bacteriology of paratyphoid fever represented a slight tribute paid to his office of assistant bacteriologist to the Institute; but for bacteriology he had

* Ritchie's Oxford class in the summer of 1899 consisted of A. E. Boycott, H. R. Dean, P. N. B. Odgers and H. M. Turnbull.

no great enthusiasm. For three years (1905-1908) he also acted as secretary to the newly instituted Advisory Committee for the Investigation of Plague in India. The three years which he spent at the Lister Institute were profoundly happy, perhaps the happiest years of his life. In 1907 Boycott was recalled to Guy's to a second tenure of the Gordon lectureship, the duties and responsibilities of which had been substantially enlarged. He became responsible for the teaching of general pathology and morbid histology and had general supervision of the post-mortem room. During the ensuing five years R. A. Chisholm, G. W. Goodhart and C. G. Douglas were his assistants. Of these years Goodhart has given the following account.

"Pathology at this time was very much the handmaid of medicine in practically all English Schools, but efforts at emancipation were already stirring and Boycott was in the van of the crusaders who should establish it as a science in its own right. To this end the post at Guy's was of inestimable value. Post-mortem examinations as the final chapter of clinical medicine were still in the hands of the physicians; classes in 'medical' and 'surgical' pathology were given by the clinical staff; nothing from the wards came near the pathological department and the lecturer could devote almost all his energies to the study of disease without any reference to its clinical application. Boycott made the most of his opportunity. Apart from the lectures on general pathology contact with students came only in the practical morbid histology class and in the M.B. revision classes; and in spite of his remarkable clarity in exposition his strict adherence to the purely academic aspect was apt to repel the interest of many who looked for something more 'practical,' so that his main influence was with a smaller group of senior students and those who worked with him in his laboratory. This consisted of a small room some 20 ft. square where Boycott himself worked, and with him for the greater part of the time was R. A. Chisholm (at that time physician to the Queen's Hospital for Children). Leading from this to the post-mortem room was a longer, narrower room where the Gull students worked and here too was Price-Jones, who was then making his early measurements of the size of the red blood cells. All day long every one who worked in this confined space was rubbing up against each other; contact could not have been more intimate, of secrets there were none and all knew what the others were doing, with Boycott the centre and inspiration of it all. Here indeed he proved himself an ideal and a beloved chief. One thing only he demanded of those who worked with him—honesty in the search for truth. If a man had this he needed no other passport to secure Boycott's active and unstinted help. Other qualities were indeed held to be desirable; a certain asceticism was expected if one was to be accounted truly worthy of the high

calling of pathology. The proper lunch for a pathologist was a cup of coffee and two buns, though on occasion frailty might be indulged to the extent of a poached egg on toast, provided it was taken at a teashop on the railway approach. If the fare was meagre the talk was stimulating; Boycott, Pembrey and Fison provided a variety of outlook and a power of lucid and forcible expression that ensured an illuminating discussion whatever the topic; and Wade, Price-Jones, Kennaway and Ryffel added spice to the feast. Tea was usually taken in 'Boycott's room'—a euphemism for a cupboard, lit by a skylight and just large enough to hold his writing-table and chair. Here Boycott held his court and dispensed tea from a large brown pot: a loaf of bread (kept in a post-mortem room crock), often mouldy, with a pot of jam completed the outfit. Anyone rejecting a mouldy crust was reprimanded for wastefulness as Boycott held that there was no harm, and probably some good, in mould. These were homely, happy and fruitful days and they provide an excellent example of the fact that the value of the work of a laboratory depends not on the magnificence of the building but on the man who works inside it.

"Boycott was an indefatigable worker; nothing was ever allowed to interfere with an experiment and one experiment often meant many days of labour. His main research at this time was into the regulation of the blood volume and kindred matters, subjects which retained a main portion of his interest throughout life. But his interests were catholic, and visitors, all with expert knowledge in some branch of science, were continually dropping in at teatime to pick his brains on some problem or other or else just to gossip on old problems or old times; then the juniors would pour out another, quite unwanted, cup of tea to provide an excuse to linger on and listen, picking up strange lore about queer things like rats and fleas and snails (whose general iniquities were then only beginning to be appreciated), the tin mines of Cornwall and rubber planting in Malay.

"When the call to Manchester came he was very reluctant to leave Guy's, and the reason of his reluctance was characteristic; most men would have felt merely a justifiable pride in the academic preferment, but he confessed that to him it brought a queer sense of shame in the feeling that he was deserting his post 'for the sake of filthy lucre.' "

P. P. Laidlaw was working during this time in the physiological laboratory at Guy's and his memories of those days are best given in his own words.

"At Guy's I met Boycott at intervals, lunch and so on, for about a year, but, as I was teaching in the physiological department, I did not have the privilege of working under him. I always admired his very remarkable range of knowledge, his clear logical thinking

and his wonderful gift of clear exposition in faultless phraseology. His keenness in research was an inspiration to all who worked with him and I still marvel at what he did in a very small and cramped laboratory. He had only two rooms and a cubby-hole near the post-mortem room for his research work, and usually had at least two other workers utilising much of the available space. Yet it was during this period that he did much interesting and very valuable work on the regulation of the volume of the blood, hæmoglobin and red blood corpuscles. Personally I consider that, amongst many interesting contributions to knowledge, this was some of the finest and most polished work he ever did, and I have gone back to it at frequent intervals ever since. He worked exceedingly hard and was intolerant of anything which interfered with his researches. One day in his laboratory I ventured to suggest that a game of golf would be nice. He looked at me once, said 'Get thee behind me Satan,' turned away and went steadily on with his work. He worked too hard and neglected his health. Life would have been easier for him had he been less conscientious, but in some ways he had an almost puritanical outlook and would never compromise once he was convinced he was right. He organised and assisted in an expansion of the Guy's pathological department, but before the reorganisation was brought into effect he moved to Manchester. His departure from Guy's was a severe blow to the pathological teaching in the School."

In November 1912, Boycott was appointed to succeed Lorrain Smith as professor of pathology in the University of Manchester and here he took up his residence and his new duties early in 1913. In Manchester Boycott found himself, to some extent at least, in a new world and in an unaccustomed environment. Friends he soon found among his new colleagues in the University laboratories. Here he met and knew S. Alexander, A. Lapworth, F. E. Weiss, W. H. Lang and J. S. B. Stopford, then a demonstrator in the department of anatomy under G. Eliot Smith, and he renewed an old friendship with C. Powell White. J. S. C. Douglas came to Manchester as his lecturer and with him he continued his work on experimental nephritis. In the society of these and other colleagues he was happy enough. But in Manchester as in other large cities the professor of pathology has duties other than teaching and research. Boycott became, *ex officio*, a member of the honorary staff of the Manchester Royal Infirmary. Here he again came into close contact with medicine and surgery and with colleagues who looked to the professor of pathology to display a practical interest in the applications of his science to the everyday problems of clinical work. In this he was asked to give something which he could not give, something indeed which he thought it wrong to give, for he believed that pathology should grow and develop as

an experimental science. He believed that professors of pathology must devote all their energies to its advancement as a science and must not waste time on the application of laboratory methods to meet the daily needs of their clinical brethren. In Manchester medical students have practical minds and it may be that some of them thought that Boycott's teaching was rather far removed from the instruction given to them by the lecturers on medicine and surgery.

Late in 1914, after barely two years in Manchester, he accepted an invitation to return to London to the chair of pathology tenable at University College Hospital. During Boycott's time at Manchester war broke out. He had never believed that a European war was even a possibility. All thought or talk of war he disliked intensely and he looked on camps, drilling and all forms of military exercise or preparation for war as a futile and wicked waste of time. The outbreak of war came to him as a shock and was a terrible disillusionment from which he never completely recovered. In 1914 he lost to a very great extent his belief in the wisdom and kindness of his fellow men. The war, coming as it did at a time when his Manchester work had presented difficulties and problems—many of them of an uncongenial kind—may have been a factor in his decision to return to London.

As Graham professor of pathology in the University of London, he was the first whole-time occupant of the chair of pathology at University College, all his predecessors having been members of the clinical staff of the hospital. In this school, pathology and clinical medicine had been intimately associated from the first, and what was largely a school of pathological physiology had been built up with a clinician at its head. Boycott, with his wide physiological training, was thus in many ways well suited to be the first whole-time professor. On the other hand he was far removed in aspirations and outlook from the pathologically or even the physiologically minded physician, and the clinical applications of pathological science bored rather than interested him. Pathology was an independent science, well able to stand on its own feet, and in that spirit he taught it. It is perhaps not to be wondered at that "to undergraduates . . . he sometimes seemed somewhat aloof and olympian." Boycott was really much more at home among amateur biologists than among medical students. The former he loved with a most powerful affection and nothing pleased him better than to enlist yet another enthusiast in his team of snail investigators.

The first years at University College coincided with the war. There was a sudden restriction of both the time and the facilities for research. Holding strongly pacifist views, he did what he could, not always with much success, to reorientate himself to the

changed conditions. In the earlier war period he was engaged on work for the Health in Munition Workers Committee, but in 1917 he received a commission as Captain (later Major) in the R.A.M.C. and in January 1918 was appointed one of the members of the Chemical Warfare Medical Committee. He was sent to Porton, where he joined a group of workers engaged in the investigation of the effects of noxious gases. Joseph Barcroft was in charge, and John Shaw Dunn and R. A. Peters were also members of the team. Here Boycott lived, with others of his colleagues, in the old manor house of Porton. He was occupied in work which, apart from its *raison d'être*, must have been wholly congenial to him. It was essentially experimental pathology and consisted largely in finding out how gases affected animals—the nature of the lesions produced and the concentrations necessary to produce these effects. It had important bearings on physiological problems in which he was already deeply interested; and while most of it was at the time of a confidential character, two papers arising out of it were published in the medical press in 1919-20. Nevertheless he must have found in his natural history studies at this time an unfailing source of recreation and refreshment. All through the war period he was making contributions to malacological literature, and at Porton most of his off-duty time was spent in field work of this kind.

To the war atmosphere and the war itself Boycott never became reconciled, and as soon as it was over he returned to his duties at University College Hospital Medical School, there to make a start on the final seventeen fruitful years of his professional life. Now he combined, as never before, intense activity in research, both pathological and biological, with increasing participation in the affairs of the scientific world. He had been elected a Fellow of the Royal Society in 1914 while still at Manchester and he served on the council from 1929 to 1931. He was a member of the executive committee of the Imperial Cancer Research Fund from 1922 until 1935 (it is said that he was more interested in cancer than in committee business!) and of the governing body of the Lister Institute from 1925 until his death. He was a member of council of the section of pathology of the Royal Society of Medicine from 1925 to 1928 and president of the section from 1928 to 1930. His two presidential addresses, on the nature of filterable viruses and on the blood as a tissue, are admirable examples of his later mature work. He served for three years (1932-35) on the Medical Research Council.

Meanwhile he was actively engaged in teaching pathology (mainly general pathology) to successive generations of medical students at University College Hospital Medical School and in directing the work of the Graham research laboratories of that

institution. The routine work of the post-mortem room and clinical laboratory he left mainly to other members of his staff. During his twenty years' tenure of the chair he was ably supported by a succession of colleagues, many of whom now occupy important senior positions in this and other schools and hospitals. In pathology we may mention the names of T. W. P. Lawrence, G. W. Goodhart, W. G. Barnard, G. P. Wright and G. R. Cameron, and in bacteriology those of H. D. Wright and C. C. Okell.

Of the University College Hospital Medical School period a former colleague (H. D. W.) writes: "To work with him was a real education. No man I know has so acute a mind, so keen a critical faculty or so just an appreciation of a piece of work and its value as Boycott had. . . . as editor he always endeavoured to seek out the little germ of truth in any unpromising paper he received, and did all he could to help the writer to bring it to light." Another colleague (G. R. C.) writes: "He hated slovenly work or untidy thinking and said so in no uncertain manner. . . . Slow to praise, a word of commendation became something to be treasured. . . . He encouraged honest endeavour. He was sympathetic towards shyness, ruthless when he suspected conceit. . . . Nothing pleased him more than to be shown an interesting preparation or told of an experiment which had gone off well. With a few brilliant touches he would bring out some broad generalisation, often startling in its implications."

Particular mention must be made here of Boycott's long and intimate association with Cecil Price-Jones. They first worked together in the Guy's days, and then, during most of the period of Boycott's tenure of the chair at University College, Price-Jones was his associate in the Graham laboratories. Here he brought to fruition his long and painstaking investigations of the size-distribution of the red blood corpuscles in health and in the various kinds of anæmia, besides collaborating with Boycott in other hæmatological enquiries.

In February 1921, in company with C. C. Choyce, he visited the United States of America on the invitation of the Rockefeller Foundation, which had just made a large grant to University College Hospital Medical School. Later, in October 1924, he visited Canada to attend the opening of the new pathological institute of McGill University, Montréal, on which occasion he delivered an address entitled "The progress of pathology." ("I do not set very much store on buildings and fitments myself—the people who use them matter much more—but you want room and light and plenty of gas, water, and electricity.") The honorary degree of LL.D. was conferred on him by McGill, and he took pride in the fact that the degree was in canon as well as in civil law. (" . . . you will find the canons interesting reading

ranging from the pattern of a parson's trousers to the time of day you can be married." 12.4.38.) One of the thrills he got out of his Canadian visit was to find in John Tait, professor of physiology, a Canadian citizen who still walked and enjoyed it.

In 1926 Boycott was elected a Fellow of the Royal College of Physicians of London under bye-law XXXVIII (b), an honour which pleased him greatly. Possibly it was his Tory blood, vainly repressed, which accounted for his fondness of ceremonial and respect for venerable institutions. He was most punctilious in his attendance at the degree ceremonies of the London University, where he was usually the sole representative of his School.

When the Pathological Society of Great Britain and Ireland was founded in 1906 Ritchie and Boycott were appointed joint secretaries. In the following year the *Journal of Pathology and Bacteriology*, which had been founded by Sims Woodhead in 1892, was purchased from its proprietors by a group of members of the Society, and Ritchie and Boycott were appointed assistant editors. This dual collaboration, editorial and secretarial, of the two old friends continued for fourteen years, until, shortly before Woodhead's death in 1921, Ritchie was appointed editor. In fact, he had taken over the major part of the editorial duties during the war: officially he was editor for two years only, being in turn succeeded by Boycott. What our Society owed to these two men in its early formative years can hardly be overestimated. Well and truly did they lay our foundations. To them perhaps more than to any others do we owe the happy informality which has always characterised our meetings. Equally did they foster that spirit of friendship and good fellowship which has infused all our activities to this day. It is impossible to think of these two men apart. Ritchie exercised a profound influence over Boycott from the days of their first association in Oxford and there was no one for whom Boycott had a warmer affection or a greater admiration.

It is difficult to imagine our Society without Boycott. Throughout the thirty-odd years of its existence he has been one of the mainsprings of its activity and always he was the outstanding personality at its meetings. Until laid aside by illness he was one of the most regular attenders and his rare absences were always the subject of regretful comment. He was, especially in earlier days, a frequent contributor to our proceedings and he was often a welcome intervener in discussion. Members liked his intolerance of humbug, his vigorous attacks on complacent orthodoxy (appreciated even by the orthodox) and in general his breezy sanity and common-sense view of things. Boycott could be devastatingly critical, but if the subject interested him and he was satisfied as to the honesty and good faith of the contributor, his remarks were always useful, illuminating, constructive: not seldom they would contain

invaluable suggestions for the settling of doubtful points or the fruitful extension of the work. His own contributions were masterly examples of how to make a communication to a learned society such as ours. He had a rooted objection to papers being *read*, and himself used only the briefest of notes or none at all. He always knew just what he wanted to say and he said it clearly, crisply and with an admirable economy of words.

Boycott's association with this *Journal* covered in all a period of twenty-six years, for sixteen of which he was an assistant editor. It was at the Oxford meeting of the Society on Friday, 13th July 1923, that he was appointed editor in succession to James Ritchie, who had died earlier in the year. In assuming this office he succeeded to a fine tradition of disinterested service on behalf of pathological science generally and of British pathologists and bacteriologists in particular. Not merely did he maintain that tradition, he enhanced it, and brought the *Journal* to a standard of excellence which has been the subject of comment the world over. All his great erudition, ripe scholarship and wide knowledge of the literature of his subject were brought to bear on this labour of love. He became editor at the beginning of a period of notable expansion in pathological and bacteriological research work in this country, work which was soon reflected in the steadily increasing number of manuscripts submitted for publication and in a roughly proportionate increase in the size of the *Journal*. During the first thirty years of its existence (1892-1922) twenty-five volumes each of 400-500 pages had been published. In 1933, the last year of Boycott's editorship, two volumes of over 500 pages each were produced. In one decade the work of the editor and his assistants had more than doubled. Boycott set and demanded a high standard in the matter of contributions. Many have acknowledged how much they owed to his critical editorial comments, and there can be no doubt that the general effect of his policy has been to raise appreciably the standard of papers submitted for publication. Of course he had his foibles. He was perhaps unduly economical in the use of capitals and commas, to the annoyance of those contributors of opposite views who felt sufficiently strongly in the matter. Duplicate publication was anathema, and many will remember the public rebuke which he administered to a contributor who had flagrantly broken the rule. He was averse from the publication of papers describing technique only. "Papers which describe methods without results are in my view preliminary and should not be printed—the proof of the pudding is in the eating not in the recipe book and methods which are not demonstrated to give good results are not worth writing about. Technique is a means to an end though of course there is a sort of man who regards it as an end in itself" (8.9.35). He constantly insisted

on the importance of the statistical analysis of numerical data, and his influence for good in this matter must have been very great.

Of Boycott the naturalist much might be written, but in this *Journal* a lengthy account of his work in this field would be out of place. He had made a life-long study of land and freshwater snails, and in the forty-six years which have elapsed since he made his first contribution to *Science-Gossip*, over ninety papers on this subject have come from his pen, nearly one-half of his total literary output. Many of these contributions are brief: others are of monographic proportions. We are indebted to Captain Cyril Diver and Professor R. C. Punnett for the following appreciations.

(From Captain Diver.) "Boycott's life-long interest in the natural history of land and freshwater snails found its first published expression as early as 1892 when at the age of fifteen he published a list of the species occurring in Herefordshire. From then until his death there was a steady stream of valuable notes and papers materially advancing knowledge in practically every aspect of his chosen study. His last papers, still in the press, were completed only a few days before his death. It was characteristic of the man that, in spite of great physical disability, he should thus finish the tasks he had in hand.

"Himself an amateur in the true sense of that now degraded word, he brought to his subject a trained scientific mind of exceptional quality; and it was his studied policy to stimulate and direct into useful channels the work of local natural history societies and other amateur bodies where he found men of knowledge but humility with whom he at once felt himself at home. He early recognised the value of biometrical and statistical methods and applied them to the solution of a number of minor problems, devoting his presidential address to the Malacological Society to a most lucid exposition of practical conchometry.

"It would have been unlike him to have neglected any new field of knowledge that might usefully be applied to the study of snails. The rapidly growing science of genetics soon drew him into its vortex, and he unerringly selected the inversion of symmetry as a problem of fundamental importance both to the student of mollusca and to the geneticist. When he began breeding inverse *Limnæa* he soon realised the difficulties ahead of him and the large scale on which the experiments had to be conducted; but he had no difficulty in enlisting collaborators and there followed some eight years of intensive work during which about one million snails were bred. The results are embodied in several massive papers. The strain of this, carried on simultaneously with all his proper pathological work, undoubtedly told on his health.

"Boycott was no collector. His pleasure was to go and see interesting and beautiful things alive in nature, and in this he did

not restrict himself to snails. Such an outlook naturally drew him into another sphere where his keen mind and the wide knowledge he had gathered throughout his life enabled him in two papers, one of which was founded on his presidential address to the Ecological Society, to lay with a masterly clarity the foundations of molluscan ecology. No worker in this field can afford to ignore these publications. Here his contribution stands in print; but the same outlook, revealed in his earliest paper, brought him into the cognate enquiry of geographical distribution, and on the death of Roebuck in 1919 he became recorder to the Conchological Society—a post which he held till his death. Building on Roebuck's material, the patient work he put in has resulted in the formation of a distributional census of the British land and freshwater mollusca which is a model for all future work of its kind for whatever group of organisms.

“Much space could be devoted to the many traits which distinguished Boycott as a man and contributed both to his great personal charm and to his uncompromising attitude on matters of principle; but no appreciation of him would be complete without mention of the real pleasure and stimulus that all must have enjoyed who were privileged to go with him on some field expedition. Here he was in his happiest vein—a true naturalist and one who never spared himself.”

(From Professor Punnett.) “More than twenty-five years ago Bateson drew attention to the interesting problem presented by the occurrence of sinistral forms among species of gastropods which are normally dextral. He pointed out that, though restricted to certain localities, it was most improbable that these curious inversions were due to environmental influences. Bateson's surmise that sinistrality has a definite genetical basis was left for Boycott and his co-workers to demonstrate in the little snail *Limnaea peregra*. The experimental work was initiated by Boycott in 1920, but it soon became apparent that, owing to the peculiar nature of inheritance involved, far greater numbers were required than could be dealt with by a single worker. Nevertheless, as early as 1923, Boycott in conjunction with Cyril Diver, published a short paper in the *Proceedings of the Royal Society* in which was outlined the theory now generally accepted. Sinistrality and dextrality form a Mendelian pair of characters, the latter being dominant, but the appearance of segregation is delayed until the F_3 generation. For the twist of an individual is determined, not by its own chromosomes, but by the nuclear composition of its parent. In general this important conclusion was confirmed in the paper published by Boycott and his fellow workers in the *Philosophical Transactions* of 1930, though certain exceptional cases have only recently been brought into line by Diver and Andersson-Kottö. The work as a

whole will take its place as one of the classics of genetical research, and the geneticist must always regret that so acutely minded and gifted an observer was unable to devote his whole time to this branch of science."

Boycott was keen on games, especially tennis, which he played well. He was a member and latterly president of the Radlett Lawn Tennis Club, becoming quite one of their best players. He enjoyed golf too, and bridge "in small amount and with the right people" he considered "worth while."

The later years of Boycott's life were clouded by ill health, in so far as it was possible for physical infirmity to cloud that ardent spirit. During the summer of 1934 it became evident that serious chest trouble had developed, and in October he entered Mundesley Sanatorium. In March 1935 he returned to Radlett, the disease apparently arrested. He had intended to resume his duties at University College in the autumn of that year, but he found himself physically so enfeebled that in July he felt compelled to send in his resignation. In November, he and Mrs Boycott joined their second son William, who had taken up farming at Ewen Farm House, Kemble, near Cirencester, and there he lived until his death.

For two years he was able to be about and to pursue, with something of the old zest, his field work and breeding experiments with mollusca. The innumerable pots and jars which housed his beloved snails now decorated the farmyard at Ewen instead of the top garden at Radlett and the roof of University College Hospital Medical School. If possible he developed an even greater affection than before for the beauty of the countryside and of the changing seasons. Some years before, he had purchased under protest a little Triumph car which he had christened *Limax*. Now, in *Limax's* successor, *Maria*, he was able to visit many of his old haunts and happy hunting grounds, especially Hereford and the Black Mountains, Devonshire, and the western buttresses and valleys of the Cotswolds. ("I was in Hereford last week and went to some of the haunts of my childhood round about the Black Mts. and Woolhope and saw several places where I am sure the devil showed all the wonders of the world: it's beautiful country that way, always hills in view, and at last praise be it's warm enough to sit down and have a good look at things." 23.8.36.) He carried on as actively as ever his extensive correspondence with innumerable friends and fellow biologists, and in collaboration with his old friend Charles Oldham, he published a fresh series of papers on the mollusca.

In January 1936 he attended the meeting of the Pathological Society at St Bartholomew's Hospital and made what was destined to be his last communication to its Proceedings—"The response

of the bone-marrow to oxygen deficiency." It was his first appearance for two years and when he rose to speak he received an ovation of such warmth and sincerity as must have brought joy to his heart. He had transfigured his personal appearance by growing a handsome beard while he was in the sanatorium, but the matter and manner of his communication were the old Boycott, lucid, logical, forceful. It was a real scientific contribution on one of his favourite subjects and a delight to listen to. Clearly semi-invalidism had not impaired that incomparable brain.

A year later, in July 1937, he attended his last meeting of the Society, at Cambridge, and it was obvious that his physical condition had changed for the worse. We were grieved but scarcely surprised to learn in September that a spinal lesion had manifested itself. ("I have been cast into bed again for the winter or thereby . . . so I lie in bed and find new beauties in the old view. . . ." 18.9.37.) In mid-October he suddenly became desperately ill and was unconscious for some days. The outlook seemed as bad as it could be, yet from this exacerbation he made a miraculous recovery and on 26th November was able to write: "Yes I am very much better than I was but still in the hands of my nurses (how good they are to me) and more decrepit than I ever thought possible . . . the last number (of the *Journal*) was a whopper but with the help of a bed table I have been able to read some of it and found some very good papers which interested me. . . . The weather is lovely and I am lying by the window in a bright warm sun with little clouds of gnats hovering about outside—pretty good for this time of year."

During the winter and spring he seemed to make a certain amount of progress and he continued to take a lively interest in persons and things, though still, of course, bed-ridden. He was visited by many of his old friends and such visits were keenly appreciated on both sides. He kept up his correspondence to the end. On 11th March he wrote: "I hope you have this incomparable weather—the days are vivid and lively airs come through the window. The nights are not so good for all the air force seems to be practising night flying"; and on 12th April, "Where are you off to this amazing Easter? . . . I do just remember playing tennis on grass at the beginning of April in my youth but I have seen nothing like it since. One perfect day after another for a month past down here and there is a swallow twittering in the eaves outside my window and I am told that if I had been awake early this morning I should have heard the cuckoo: the garden is reported speckled with butterflies though I can't see them, nor the dog fight I hear going on."

He died in his sleep in the early hours of Thursday, 12th May.

Boycott married, in 1904, Constance Agg, daughter of

Colonel William Agg of the 51st King's Own Yorkshire Light Infantry. Of their two sons, John, the elder, is assistant bacteriologist to St George's Hospital, William is farming in Gloucestershire.

Worthy tributes to Boycott, the man, have already appeared in the press, and we venture to quote from one or two of them. His old friend and colleague of Lister Institute days, Sir Charles Martin, thus concludes his appreciation in *The Lancet* of 21st May :—

“ A man of wide knowledge and understanding, Boycott pursued knowledge for its own sake. Indeed, this singleness of purpose became exaggerated until he regarded with suspicion a quest which might lead to results of some immediate usefulness. He had a keen appreciation of good writing and wrote with peculiar literary charm. He had a well-trained penetrating mind. No one, after listening to a meandering discussion, could better gather together the essential points and express the position with greater precision. He loved quiet controversy and could convey a provocative criticism with humour and whimsicality and as he was an interested listener as well as a good talker he was a charming companion. He was terribly upright and refused compromise. This rigidity sometimes amounted to intolerance and impaired his influence. He also had some quaint antipathies. For many years he would have nothing to do with motor-cars and until the last abhorred wireless. Both of these inventions he regarded as spoiling civilisation. The combination of wide sympathies with unexpected prejudices in the mental make-up of this gifted lovable creature was understood by his intimate friends who could appreciate the former and make allowance for the latter. To me, whom he regarded as inclined to perfidy, he was a considerate and affectionate friend and his death has removed one of the best human associations which has come into my life.”

The following is from the leader in the same number of *The Lancet* :—

“ He had the rare and authentic literary gift of being able to infuse his personality even into the shortest letter or paragraph. He was perhaps to be seen at his best presiding with old-fashioned hospitality at the tea-table in the Graham library. Here plain living and high thinking were the order of the day. There was no butter to the bread but there was always spice to the conversation. Visitors of the most diverse interests would drop in. They were usually experts in something or other, for Boycott had a flair for knowing experts of all kinds. In conversation he was as good a listener as a talker and this was no doubt what made him so delightful a companion to man, woman, or child. If he was an

individualist, his individualism was of the kind to express itself in society rather than in solitude. He loved conversation and the fellowship of alert minds, and though an omnivorous reader he preferred, as he used to say, to hear things 'by word of mouth.' He was a prodigious attender of scientific meetings and he seemed to know in advance of every new thing in the world of biology. All ranks of British pathologists will miss his outstanding influence, but his intimates will have the added feeling that the world is permanently a little more drab for the loss of so vivid and kindly a personality."

An anonymous correspondent writes in *The Times* of 19th June :—

"For his friends a walk with him in the country was an education as well as a delight. He was a close student of the changing seasons as reflected in the changes of vegetation and animal life. He had an inspired capacity for observation of living creatures in their natural habitat and the rare gift of communicating his own joy and wonder to others. His power to apply a scientific principle was mingled with this, and a mountain tarn would be explored to investigate the limits of temperature between which certain species could thrive and samples of water be removed for analysis. A visit to a remote corner of Ireland would be undertaken with enthusiasm on the chance of finding a rare slug.

"Tall of stature and of a distinguished appearance, he possessed great social charm. He was affectionate and generous in nature and his vivid and forceful personality had a large element in it of the unusual and unexpected, even for his intimate friends. For these his death leaves an emptiness which can never be filled, but his loss will also be deeply felt by that larger circle with whom he came in contact as colleague, teacher, and neighbour, this last being interpreted in the widest sense of the word."

Boycott was essentially a religious man, though in such matters he did not often express himself. He did have a very deep conviction of, shall we say, the supremacy of God and the importance of remembering this fact. Reared in the traditions of the Church, he was prepared for confirmation but characteristically, as he could not honestly believe all he was required to, was never confirmed.

Boycott's greatest contribution to pathology was the example which he set us by the purity of his scientific life. He believed in the pursuit of science as the natural occupation of the seeker after truth. Pathology he looked on as the search for truth by the means available to a pathologist. For him the advance of knowledge

was the only and sufficient aim and recompense of labour. The practical applications of his science he regarded as irrelevant and he thought that the pursuit of knowledge for any ulterior motive, even the alleviation of human suffering by laboratory methods of diagnosis or treatment, an unworthy occupation for a pathologist. He never deviated from his own ideal and by the exposition of his views to his friends, but far more by the example of his own work he exerted a tremendous influence on his contemporaries. His faith, fearlessly expressed when he was still a young man and at a time when pathology was still a young science, played a bigger part than young men of to-day can understand, who have been brought up in days when pathology occupies an established and honoured place in the sisterhood of sciences.

H. R. D.

M. J. S.

The biographical facts of Boycott's life have been dealt with by the two previous writers, but the editor has asked me to add some impressions of the man and his work and I gladly accede to his request. I am fully aware that what I have written is necessarily imperfect and partial in character—he was so many-sided, so catholic in his outlook and so versatile in his activities.

With the advantages of an admirable training in biology and experimental physiology Boycott started the study of pathology at Oxford. There was no chair and no department of pathology at that time, and he himself has vividly described in the obituary notice which he wrote of James Ritchie in *The Lancet*, what the training then was. But defect in equipment was made up for by the stimulating influence of Burdon Sanderson and Ritchie. One may almost say that Boycott's life work came from a response to Ritchie's advice of "read Cohnheim." A separate examination in pathology was instituted in, I think, 1899. Andrewes and I were the first external examiners and Boycott was one of the second batch of men to be examined. I remember Ritchie telling me that he was a man of exceptional ability and erudition, and this was fully confirmed in the examination. My "searching questions" were soon exhausted and the *viva* became an interesting talk about some of the great problems. The extent and precision of his knowledge at that time were indeed extraordinary.

Boycott's outlook from the first was that of the general pathologist. Fully versed as he was in the facts and methods of physiology, it was natural that his work should be in the field of experiment. But his interest was not confined to it; he was not an experimental pathologist in the narrow sense. He was fully alive to the inseparable union of disordered structure and disordered

function, and the importance of the morphological side bulked more largely in his mind as the years went on. Let us find out about disease by any method possible and then let us see what we can make of it—this was something of his attitude. He recognised that the human organism is a much more complicated affair than the canine or even the simian. Its abnormalities can initially be ascertained only by observation but their exact analysis necessarily leads to and can only be effected by experiment. The behaviour of the organism in times of stress may be said to be the keynote of most of his work.

A potent factor in Boycott's life was the influence of J. S. Haldane and collaboration with him at an early period resulted in an important series of researches on ankylostomiasis. Questions raised during these investigations carried him on naturally to subjects of blood volume, blood regeneration, respiration, etc. In this way Boycott's work for many years may be said to have been set; a natural sequence of events can be traced through it. He diverged at times into bacteriology and other subjects and we must not overlook the fact that his long series of papers on molluscs had started long before those on pathological subjects. I am not fitted to deal with these, but they must be kept in mind in gauging his work as a whole. He led, in fact, a sort of double scientific life.

The ankylostomiasis work established his scientific reputation, be it noted before he had reached the age of thirty. It was an exhaustive study of the disease in all its aspects, carried out by all the methods available, and will remain as authoritative. One of the most important results from the general point of view was the determination that in the anæmia of ankylostomiasis there is an increase of blood volume corresponding to what Lorrain Smith had found in the case of chlorosis, and also that the blood volume can be brought back to normal by vermifuges just as occurs in the cure of chlorosis. The examination of the blood changes was undertaken by Boycott, and a separate paper published by him well illustrates his demand for full and detailed observations before drawing conclusions. No more admirable example of how the pathology of a disease may be attacked in all its aspects can be found than what is recorded in these papers by Haldane and Boycott.

His next noteworthy research was with regard to caisson disease and the results were dealt with in a series of papers. In portions of this work he had the collaboration of J. S. Haldane and G. C. C. Damant, but the first and fundamental paper was by himself alone. Much of what has been stated with regard to ankylostomiasis applies to this subject also—as regards detailed working out, full discussion of the principles involved and practical application of the results.

The disease is first described in all its aspects—symptomatology, conditions of occurrence, etc.—and this is followed by the experimental investigations in relation to these. The experiments were carried out on goats and the effects of compressed air at different pressures were fully studied. The principles of respiration, the facts regarding the taking up and giving off of gases by the tissues, the lesions found, the rationale of their distribution, the mechanism of the effects—especially those on the nervous symptoms—and many other questions are dealt with in full detail. These results are then applied to the disease in the human subject, and the phenomena as a whole are elucidated in a remarkable manner. It is worthy of note that the marked degree of varying susceptibility to compression in man is found also in the goat; and the influence of fatness on susceptibility is another interesting subject dealt with. Finally the results are applied practically, as regards both the prevention and treatment of the disease. The whole work can only be described as masterly.

The work on ankylostomiasis raised many questions concerning the blood and blood volume. His appointment to the Gordon lectureship at Guy's Hospital gave him the opportunity to tackle their solution and the possibility of applying the CO method to small animals, introduced by C. G. Douglas, provided the chief means. Percentage estimation of hæmoglobin was replaced by total oxygen capacity. Thus from 1907 onwards we have that remarkable series of papers in this department. As a preliminary, exhaustive observations were made on the blood volume of normal animals and then the method was applied to such questions as blood regeneration, transfusion, etc. His discussion on the way in which the body increases its power of disposing of excess homologous red cells is a good example of his mode of thinking and analysis. In the later papers on the blood volume in nephritis there is brought out evidence that an alteration in the capillary endothelium as regards passage of fluids is present throughout the body. This is a matter of importance and one which might be followed up with advantage. In this period also we have two papers from him in collaboration with C. Price-Jones on the anæmia produced by aniline poisoning and by trypanosome infection respectively. Thus was started the long and intimate association of the two men which led to the well known work on the red cells by Price-Jones.

Boycott's experimental work in this field was interrupted by his appointment to the chair of pathology in Manchester and was not resumed for a considerable time. At a later period, however, we have two important papers from him, written in association with Oakley. The work there recorded was aided by a study of the reticulocyte response and led to the demonstration that increased

oxygen tension and also blood transfusion resulted in a diminution of blood formation. There was thus established a counterpart to the results with regard to the effect of living at high altitudes, and this clinched once and for all Boycott's view as to oxygen tension being the regulating influence of hæmopoiesis. In this way it was shown how the body seemed to do just what was needed in varying conditions of oxygen supply.

In all these researches Boycott stands out as an unusually able and expert investigator. He spared no pains in attention to details and their working out. Any slipshod statement or unjustifiable inference was repugnant to him. Let us see that we have really the facts before we consider what may be made of them. It was, however, with regard to the latter question that he specially shone; here his mental grasp and suggestiveness stand out. What does the body do in certain circumstances, how does it do it, and what is the significance? These questions were always taken by him in sequence. The behaviour of the body in reaction and adaptation was his absorbing interest.

In the later years of Boycott's life we have a number of addresses, which perhaps even more than his scientific papers display his powers as a thinker and critic and his way of looking at things. These need not be referred to in detail but one or two may be mentioned. "Our Best Friend" is a charming address and written in his lighter vein. The sentence, "When the body finds itself in trouble it does things which are helpful" is a good example of his knack of putting pathological truths in homely language. His presidential address to the section of pathology of the Royal Society of Medicine (1928-29 session) on "The Transition from Live to Dead; the Nature of Filtrable Viruses" has attracted most attention. In discussing the subject, facts are culled from all the sciences and an attempt is made to escape from the dualistic hypothesis. His views with regard to viruses will not be accepted by the majority of workers on the subject, but some of his statements have proved wonderfully prophetic of what has since been established. His presidential address of the following year, "The Blood as a Tissue," is outstanding in its attractiveness of presentation. He is dealing with his own subject and his survey of the clinical and experimental facts is what we would expect, but it is the way in which they are marshalled in relation to the central idea that is so unusual. The address is one which can be read and re-read with pleasure and makes us think how much more interesting pathology would be if other subjects could be dealt with in a similar way. It would have been a great thing to have had a work from him on general pathology; but we cannot have everything and we can hardly imagine the possibility of more being packed into his life's work. In this latter address the great problems

referred to are taken up again and his attitude towards mechanistic theories shows once more the influence of J. S. Haldane.

The Pathological Society was ever a matter of absorbing interest to Boycott. An original member, he from the first devoted himself heart and soul to its progress and success, and he did much to ensure the co-operation of all the schools and to extend its influence. There has always been, more or less, a sort of family feeling among the members and this was a real gratification to him. He always looked forward to its meetings, and one could not fail to be impressed by the delight which he manifestly had in being able to resume attendance after a period of absence due to illness. He was an outstanding figure in every way and, as regards both matter and form, one of the best speakers the Society has had. He had a rare command of expressive language and though his words came readily he was never prodigal in their use, but always concise and to the point; and his classic English was interspersed with homely and colloquial words and phrases which added a piquancy to what he said. He appreciated quality in everything; he liked to hear a paper well given and he set an example. I think of Sir Frederick Andrewes too in this connection. In discussions Boycott's critical faculty was much in evidence. He had read widely and had thought much, and questions and doubts regarding things generally accepted were constantly arising in his mind.

His devotion to the *Journal* was equally great, and for years he gave his energies towards making it as good as possible. Under the editorship of Woodhead and Ritchie it had acquired a character of distinction, and this became emphasised when it was under Boycott's care. Quality of work was of course the first thing, but his was no utilitarian standard as to how the work was presented. Many of the younger contributors to the *Journal* will, I think, be grateful to him for instruction as to the requirements in preparing a paper for the press. He certainly possessed the degree of autocracy necessary for the job and he had also views of his own as regards such things as punctuation, etc. I remember once asking him what his authority for one of these was and his answer was "Clifford Allbutt," but the answer was given with a smile which expressed a doubt as to whether it would be satisfactory to me; and he added "but you can have capitals if you wish." In his hands the *Journal* reached a standard which we may all be proud of, and the good work is still being carried on. For what Boycott did for it, the time and labour he gave freely, we are his debtors indeed.

It is more difficult to speak of Boycott's personal qualities and their true portrayal would demand a more intimate association with him than I had, but certain features stand out. The term 'personality,' too often used in a loose fashion, arises at once in one's mind when one thinks of him, and it is eminently suitable.

It is no exaggeration to say that everyone who came into contact with him was impressed by his personality. His uprightness, his straightforwardness in word and deed and his courage were apparent to all. He had high ideals of service in every respect and gave himself unreservedly to any cause which he took up; whether in the editing of the *Journal* or in the work of a committee, he never spared time or trouble. He had rigid principles of right and wrong, though he sometimes carried them into minor matters where the difference might be one of opinion. His outlook on life was serious, thoughtful and questioning rather than complacent, and his chief enjoyment came from his work and reading, and from what his love of nature brought to him. He was kindly and unselfish and gained the affection and devotion of those who knew him best. A great interest of his was in the younger men and he often discussed with me who were "the good ones coming on"; he was ever ready to help them in any way he could. Undoubtedly a great personality has gone from us.

R. M.

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